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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,340	12/27/2001	Michael D. Ruehle	10559-635001/P12330	8398

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EXAMINER	
JAGANNATHAN, MELANIE	
ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 07/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/034,340	RUEHLE, MICHAEL D.	
	Examiner	Art Unit	
	Melanie Jagannathan	2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/27/01,08/06/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-23, 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Larson et al. US 4,833,468.

Regarding claims 1, 4-5, the claimed selecting a configuration for layers of a permuting network based on a set of integer factors of N, the number of signals to be permuted, and on pre-selected types of switches is disclosed by stages of switches and constructing the permuting network in layers by using the pre-selected types of switches based on selected configuration is disclosed by layered network comprising a class of multi-stage interconnection networks where parameters defining layered network include N number of processors connected to network and using $\log_b N + 1$ stages of switches and $N*(\log_b N + 1)$ switches, with N switches per stage. See column 2, lines 63-67, column 6, lines 10-22, lines 39-55.

Regarding claim 2, the claimed each of the types of switches is capable of selecting one signal from among a number of signals, the number being different for different types of switches is disclosed by switches (Figure 6, elements 20) in first stages select from one signal (Figure 6, elements 0-7) while switches in second stages (elements 20) select from five signals.

Regarding claim 3, the claimed integer factors corresponds to number of signals that one type of switches can select from is disclosed by $\log_b N + 1$ stages of switches, with b* p

terminals on the left and right side, b being the base of logarithms and p being number of planes. If N=8, b=2, p=2, there would be 4 stages of switches, 8 switches per stage and 4 terminals for 4 signals. See column 6, lines 10-55.

Regarding claims 6, 10, the claimed receiving N signals are disclosed by N processors. See Figure 6, elements 0-7. The claimed re-ordering N signals using a permuting network constructed from layers of switches having a configuration based on a set of integer factors of N, and on pre-selected types of switches is disclosed by layered network comprising a class of multi-stage interconnection networks where parameters defining layered network include N number of processors connected to network and using $\log_b N + 1$ stages of switches and $N*(\log_b N + 1)$ switches, with N switches per stage. Layered network involves switch setting algorithm to connect any permutation or combination of inputs to outputs. See column 2, lines 63-67, column 6, lines 10-22, lines 39-55, column 8, lines 43-48.

Regarding claim 7, the claimed each layer has N switches of same type, each type of switch having a predefined number of input terminals and one output terminal is disclosed by N switches per stage and b* p input and output terminals with each terminal switching out one signal from the inputs. See Figure 6, column 4, lines 31-43, lines 60-67, column 5, lines 1-4, column 6, lines 10-55.

Regarding claim 8, the claimed each layer of permuting network groups the N signals into subsets of signals and permutes the ordering of subsets of signals is disclosed by N signals input to layered network with network using switch setting algorithm to connect any permutation or combination of inputs to outputs. See column 2, lines 63-67, column 6, lines 10-22, lines 39-55, column 8, lines 43-48.

Regarding claim 9, the claimed assigning of multi-dimensional coordinates to switches, each switch in layer having a different coordinate, configuring the switches so that when a signal propagates from a first switch in one layer to second switch to next layer, the coordinates of two switches differ in one dimension only is disclosed by switch in stage denoted by Switch (stage-number, switch number) and connecting right-hand switch terminal to a left-hand switch terminal in next stage involves a change in stage number in coordinates. See column 6, lines 53-59.

Regarding claims 11, 13-16, 28-29, the claimed apparatus with N input terminals, N being an integer, N output terminals is disclosed by layer network with N request terminals on the left side of network and N response terminals on right side of terminal. The claimed permuting network configured to form non-blocking signal paths that connects input terminals to output terminals in arbitrary order, the permuting network constructed from layers of switches of different types, each layer having same number of switches, each type of switch capable of selecting one signal is disclosed by layered network comprising a class of multi-stage interconnection networks where parameters defining layered network include N number of processors connected to network and using $\log_b N + 1$ stages of switches and $N*(\log_b N + 1)$ switches, with N switches per stage. Switch in stage denoted by Switch (stage-number, switch number) and connecting right-hand switch terminal to a left-hand switch terminal in next stage involves a change in stage number in coordinates. See column 6, lines 53-59.

Layered network involves switch setting algorithm to connect any permutation or combination of inputs to outputs. See column 2, lines 63-67, column 6, lines 10-22, lines 39-55, column 8, lines 43-48. There are b* p input and output terminals with each terminal switching

out one signal from the inputs. See Figure 6, column 4, lines 31-43, lines 60-67, column 5, lines 1-4, column 6, lines 10-55.

Regarding claim 12, the claimed each switch having input and output terminals, the input terminals of switches in first layer coupled to N input terminals of apparatus, output terminals of last layer coupled to N output terminals of apparatus, and for all layers except last layer, output terminals of switches connected to input terminals of switches in next layer is disclosed by layered network (Figure 6) with 8 input terminals coupled to first stage of switches, 8 output terminals coupled to last stage of switches and other stages have output terminals connected to switches in next stage.

Regarding claim 17, the claimed each of input terminals of each permuter in 2^{nd} layer to the (2D-1)th layer is connected to output terminal of a different permuter in previous layer is disclosed by cross-connection between output and inputs in switches (Figure 6).

Regarding claims 18-23, the claimed first device to generate N signals having a first ordering and second device configured to accept N signals arranged in second ordering is disclosed by N input signals to layered network providing communication paths between digital computers or other electronic devices. Layered network involves switch setting algorithm to connect any permutation or combination of inputs to outputs. See column 2, lines 63-67, column 6, lines 10-22, lines 39-55, column 8, lines 43-48. See column 2, lines 63-67, column 4, lines 60-65. The claimed permuting network constructed from layers of switches of different types, each layer having same number of switches, each type of switch capable of selecting one signal is disclosed by layered network comprising a class of multi-stage interconnection networks where parameters defining layered network include N number of processors connected to

network and using $\log_b N + 1$ stages of switches and $N*(\log_b N + 1)$ switches, with N switches per stage.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson et al.

Larson et al. discloses all of the limitations of the claims except for computer program stored on computer-readable media for causing computer system to perform steps disclosed above. At the time the invention was made it would have been obvious to translate steps into code for use by the layer network switches of Riemann et al. One of ordinary skill in the art would be motivated to do this for the efficiency due to an automated system.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Larson et al. US 6,215,786 disclose implementation of multi-stage switching networks.

Bazarjani US 6,608,575 discloses hybrid multi-stage circuit.

Samsudin et al. US 6,721,311 disclose self-routing permutation networks based on de Bruijn digraphs.

Li US 6,657,998 discloses conditionally non-blocking switch of unimodal-circular type.

Monacos US 5,377,182 discloses non-blocking crossbar permutation engine with constant routing latency.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Jagannathan whose telephone number is 571-272-3163. The examiner can normally be reached on Monday-Friday from 8:00 a.m.-4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ

FRANK DUONG
PRIMARY EXAMINER